

*Public Use at
Don Edwards
San Francisco Bay
National Wildlife Refuge*



Annual Narrative 1997

*Education, Interpretation,
Law Enforcement, Volunteer Management,
and other wildlife-oriented programs for people*

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1997 ANNUAL NARRATIVE PUBLIC USE SECTIONS

E.2. Youth Programs

Boy Scouts and Girl Scouts

During 1997, 4 Refuge employees were involved with Scouting. Seventy-seven Scouts logged a total of 749 hours at the Native Plant Nursery, on trails, and on special projects. Scout groups also helped with trash pick-up and with maintaining trail markers. At the Environmental Education Center, 149 scouts participated in 20 hours of interpretive programs, including map adventures, tours, and a birding workshop.

Eagle Scout Candidate Conor Tyson, of Troop 122, completed his eagle scout public service project on the Refuge. He led his troop in the planning, construction and installation of trail barriers along the Tidelands Trail near the Visitor Center during the spring and early summer. The trail barriers – single 2" x 6" pressure-treated boards attached to 6" diameter peeler cores – now line the Tidelands Trail edge in areas where hikers have departed the trail and cut across the hillside. Stained dark brown, they look good and will be very effective in keeping visitors on the trail. As a result, shortcuts will be prevented and the habitat will be protected.

Volunteer Programs

General

Volunteers were vital to the continued success of many Refuge programs. In 1997, 695 volunteers contributed 34,427 hours to the main and satellite refuges, which at a minimum wage of \$5.25 per hour, saved the government \$180,741.00. Regular volunteers, occasional and one-time volunteers, and Student Conservation Association (SCA) interns participated in biological research and monitoring, plantings, clean-up events, interpretive programs, education programs, maintenance projects, and office projects. Volunteers staffed the Visitor Center 85% of the time, patrolled Refuge trails and the fishing pier, and presented 99% of all weekend interpretive programs, including walks, slide shows, and tours. Volunteers also participated in habitat restoration projects at the main and satellite refuges, helped census endangered and threatened species, and planted native grasses and shrubs.

Volunteers contributed to the on-going success of the Environmental Education Program at the Refuge, helping develop new activities and materials, assisting with learning stations on field trips, and developing and maintaining the Butterfly Garden and Migratory Bird Garden. Joan Telfer continued to present programs to schools on the Common Murre Restoration Project.

Volunteers also assisted in the office with large mailings, data entry, San Francisco Bay Wildlife Society memberships, Society bookstore orders, and general clerical duties. They also assisted with maintenance and landscaping projects, especially



Ruth Mundy is typical of over 100 hard working Refuge volunteers.

Volunteers also assisted in the office with large mailings, data entry, San Francisco Bay Wildlife Society memberships, Society bookstore orders, and general clerical duties. They also assisted with maintenance and landscaping projects, especially weeding, pruning, and painting. Resource management projects which utilized our volunteers included planting of native species, weeding of non-natives, the Annual Butterfly Count and Evening Primrose planting at Antioch Dunes NWR, Black legless lizard surveys and snowy plover exclosures at Salinas River NWR, replanting native grasses at Ellicott Slough NWR, bird call counts and surveys, Butterfly Garden monitoring, data entry and analysis, and cleaning, painting, and mounting decoys for the Common Murre Restoration Project.

External Refuges

Volunteers assisted with various projects at other National Wildlife Refuges. They were important at Farallon NWR, San Pablo Bay NWR, Antioch Dunes NWR, Salinas River NWR, and Ellicott Slough NWR, where they performed many wildlife biology and habitat management tasks. Working with the San Francisco Bay Wildlife Society, our cooperating association, volunteers continued to order books not only for Don Edwards San Francisco Bay NWR, but also for sales outlets at Klamath, Sacramento, and Malheur NWRs.

Nursery

Volunteers Harry and Gretchen Sanders were tireless in their efforts to run and manage all aspects of the Native Plant Nursery. Harry, a retired chemist and

University of California Master Gardener, and his wife Gretchen cultivated 6,000 individual plants of almost 200 native species. They organized and coordinated two successful plant sales which grossed over \$6,000. Harry and Gretchen also trained and supervised 121 nursery volunteers and worked with school groups on a regular basis. Volunteer Gretchen Sanders also established a butterfly garden near the visitor center.



Volunteer Harry Sanders managed the Refuge's Native Plant Nursery.

Butterfly Garden and Migratory Songbird Garden

The Butterfly Garden and Migratory Songbird Garden provide opportunities to investigate the importance of preserving and protecting native habitat, and demonstrate how to successfully garden without pesticides. Eight work parties comprised of 151 volunteers from Sierra Singles, Community Impact, Quantum Corporation, Beth Am Synagogue, Saratoga High School National Honor Society, Fremont Girl Scout and Campfire Club, and the Refuge helped expand the two demonstration gardens. The volunteer groups weeded by hand and spread a 4 inch layer of coarse mulch to deter exotic plant growth in the future without the use of pesticides. They also planted additional plants that are attractive to local butterflies in the Butterfly Garden. Thanks to these dedicated volunteers the Butterfly Garden and Migratory Songbird Garden are becoming well established. In addition, the Butterfly Garden is being utilized extensively in the weekday field trip program and the weekend interpretive program.

Refuge volunteers began monitoring the Butterfly Garden this spring to document which plants are successfully attracting butterflies. Approximately 70 hours were spent collecting over 450 observations. Volunteers also created a database to analyze the data. The information gained from this will be used to make recommendations to visitors interested in attracting butterflies to their yards.



The Butterfly Garden at the Environmental Education Center was utterly dependent upon volunteer time and labor.

Public Outreach Events

Volunteers were vital to the success of many Refuge events, including the Native Plant Sales, Earth Day, the Refuge's 25th anniversary celebration, and National Wildlife Refuge Week.

Volunteers helped organize and run Earth Day festivities this year. The day began with the traditional Refuge cleanup and was followed by a non-native plant removal cleanup, interpretive and educational programs, children's activities, and a native plant sale.

Student interns Genie Moore and Sharon Kamin visited area schools and gave presentations in celebration of National Wildlife Refuge Week. The Refuge's 25th anniversary celebration and Wildlife Art Auction took place during National Wildlife Refuge week. Volunteers helped with all aspects of the successful celebration, which

was attended by hundreds of people. See Section H.6 for a more complete description of our National Wildlife Refuge Week Programs.

Junior Naturalist Program

Some of our youngest volunteers shared their knowledge with their peers during this past summer's Junior Naturalist program. These volunteers, previous graduates of the Junior Naturalist program, as well as new and established environmental education volunteers, assisted refuge staff members with teaching 3rd through 6th graders about the salt marsh and its ecological importance. See Section H.2 for a more complete description of the Refuge's summer day camps for kids.

Student Conservation Association Internships

Student Conservation Association interns play an integral role in the biological management and education programs at the Refuge. In 1997, 11 SCA interns each contributed 40 hours a week for at least 16 weeks.



Student Conservation Association Interns Sharon Kamin and Genie Moore presented a program to a class during National Wildlife Refuge Week.

Intern Becky Miller grew over 700 seedlings of the Antioch Dunes Evening Primrose, an endangered plant species. Becky also helped coordinate the annual planting of Evening Primrose at Antioch Dunes NWR, in addition to the annual Lange's Metalmark butterfly count in September. Intern Kelly Hutton oversaw the clean-up of Mayhew's Landing, a new addition to the Refuge. Kelly also assisted with surveys of the California Clapper Rail and developed and conducted a bird survey for Mayhew's

Landing. Kelly's bird survey of Mayhew's Landing will be continued by three new volunteers; in addition, her survey protocol will be used as a model for setting up bird surveys in other areas of the Refuge.

Intern Genie Moore assisted with all of the environmental education programs in Alviso. Genie continued the work of past interns with the Beaks and Feet Project. Sharon Kamin developed materials for the Wetlands Round-Up Field Trip program and helped lead numerous teacher training workshops. See Sections H.2 and 3 for a more complete description of our Environmental Education Program.

Environmental Education interns in 1997 were: Kerstin Butz, Ann-Marie Godfrey, Sharon Kamin, Genie Moore, Joanna Nelson and Laura Waid. Wildlife Biology interns were: Christine Aiken, Kelly Hutton, Lisa Infante, Kim MacDougall and Becky Miller.

Volunteer Awards

Refuge volunteers were recognized in June for their efforts during calendar year 1996. The Annual Volunteer Picnic and Recognition Ceremony was held at the Refuge headquarters in Fremont. All volunteers received a Certificate of Appreciation, and some also received gifts such as San Francisco Bay Wildlife Society tote bags, pen sets, plaques, and gift certificates. In addition, volunteers who have accumulated hours in increments of 500 and 1000 were recognized with special pins and plaques. Volunteer of the Year honors went to Lee Lovelady, who has contributed over 5,000 hours to the Refuge .



Refuge employees presented a skit in honor of the volunteers at our June banquet.



Volunteers Angela Gatto (above) and Tooky Campione (below) helped on our native plant sales.





Volunteer Haven Thompson (above) didn't wait for the kids to visit the Refuge; she visited the local shopping mall to reach them.

Volunteers from the community cleaned up the Refuge on Earth Day .



H. PUBLIC USE

H.1. General Public Use

San Francisco Bay National Wildlife Refuge serves a dense, local population of 7 million people. It is an ideal place for Bay area urbanites to visit a relatively unspoiled area, enjoy the local wildlife and learn about nature, conservation and wildlife management.

The Public Use Division is composed of three sub-divisions. The Environmental Education Program teaches conservation and wildlife values to children, their parents, and their teachers. The Interpretation and Outreach Program explains natural history and salt marsh ecology to families and other audiences on and off the Refuge in a wide variety of media, and generates public recognition of the National Wildlife Refuge System. The Law Enforcement Program enforces laws and provides for public safety.

The Public Use Division's responsibilities include Refuge signage tasks, development of exhibits, construction of visitor facilities, writing of brochures and other publications, administration of an active volunteer program, and advancement of general community relations and involvement.

During 1997, 299,302 people visited the Refuge. 44,462 people stopped in at the Visitor Center or the Environmental Education Center, and 4,028 attended interpretive programs, special events, artist receptions and other events. 13,090 students, teachers, and other adult leaders attended environmental education activities at the Environmental Education Center in Alviso or the Visitor Center in Fremont. Over 99,000 visitors received our self-guided interpretive messages when they read our wayside exhibits.

The Visitor Center in Fremont was closed on Mondays and all Federal holidays. The trails and fishing pier remained open from 7:00 a.m. to sunset every day except New Year's Day, Thanksgiving and Christmas.

The Weekend Interpretive Program at the Environmental Education Center was funded by the Santa Clara County Urban Runoff Pollution Prevention Program. The Interpretive Specialist employed to carry out this is an employee of the San Francisco Bay Wildlife Society, which administers the grant from Santa Clara County. The EEC Director manages the personnel and programs associated with the grant. At the EEC 2,095 people attended interpretive programs and special events.

The Environmental Education Center is open and staffed from 10 AM to 5 PM on Saturdays and Sundays. There was a good turn out by the public for trail usage and nature walks despite the trail closure due to the salt compay levee maintenance beginning in August. (Every few years, new mud must be dredged up and heaped on the rim of each salt pond levee, which is slowly settling due to gravity.) The dredging of the salt pond closest to the Education Center during 1997 severely limited trail access and caused a decrease in drop-in visitors. We had a total of 6,293 at the Environmental Education Center on weekends this year.

Most of our 1997 visitors participated in recreational activities other than formal programs at one of the two centers. The public fishing area (6,000 users), trails (93,717 users), sloughs (3,900 duck hunters in boats, and 195 wildlife oriented recreational boaters), and other public areas were used by 106,837 visitors. Many of these people were contacted in the field by Refuge volunteers on patrol.

2. Field Trips (Outdoor Classrooms) Students

The Refuge conducts environmental education at both the Environmental Education Center in Alviso, and the Visitor Center (consisting of the Visitor Center, proper, and the nearby Newark Slough Learning Center) in Fremont. In 1997 the Refuge offered two types of field trip programs for students.

The Wetland Round-Up (K-8 grades) and Trekking the Refuge (3-6 grades) field trip program formats allow for small groups of students to rotate from one learning station to the next throughout the day. As a result, students and accompanying adults spend an entire school day learning about the importance of the resource management objectives of the Refuge: preserving and protecting significant wildlife habitat in the South Bay, protecting threatened and endangered species, and protecting migratory birds.

Before bringing a group to one of our field trip programs, at least one educator and one other adult must attend a 4-hour field trip orientation workshop. Other adults from a group are encouraged to attend these workshops too. Upon completion of workshop, an educator has all the necessary tools to plan and conduct an exciting field trip.

Educators recruit volunteers (usually students' parents) to assist with the field trip. A high adult to student ratio (2 adults to every 10 students) is required. This ratio allows one set of adults to be learning station leaders and the other set to be chaperones who also assist the station leaders. The learning experience is enhanced by the small group setting and students are taught more effectively because of individual attention.

A Wetland Round-Up field trip includes an opening activity for the students conducted by a volunteer (usually a Student Conservation Association intern) while a staff person orients the adults to the lay of the land. Then the students divide into small groups of about ten students and begin activities at different learning stations, rotating from station to station during the course of the day. About half of the adults are the small group chaperones, each moving with his/her group to each learning station. The other adults teach an activity at a learning station, repeating the activity for each group during the field trip day. The educator acts as a "floater", available to help parent leaders with their learning station activities, answer field trip logistic questions and take care of any student emergency. A closing activity at the field trip's conclusion summarizes topics and ties together any loose ends to make the day's visit more memorable for the children.

The Wetland Round-Up field trip requires the help of a staff person and intern in conducting the field trip opening and closing activities, showing the adult leaders and chaperones the locations where the learning station rotation activities are to be

conducted, demonstrating the first rotation of an activity, and overseeing the flow of the field trip with the educator in charge. The educators select their own field trip activities and classroom activities from the *Salt Marsh Manual, an Educator's Guide*. A typical field trip has six learning stations (hands-on, environmental education activities are conducted at these stations) and the group consists of two educators, sixty-five students, and twelve to fourteen parents (six learning station leaders, and six to eight chaperones).

***Wetland Round-Up* Sample Schedule**

9:00	Bus arrives at the refuge
9:15 - 9:45	Habitat slide show - opening with students conducted by staff or intern Adult orientation - conducted by staff or intern
9:45 - 10:15	Station #1 (Mud Studies) - conducted by school volunteer
10:15 - 10:45	Station #2 (Beaks & Feet) - conducted by volunteer
10:45 - 11:15	Station #3 (Where Have All The Wetlands Gone?) - conducted by volunteer
11:15 - 11:45	Station #4 (Wetland Water Cafe) - conducted by volunteer
11:45 - 12:10	Lunch
12:10 - 12:40	Station #5 (Salinity Testing) - conducted by volunteer
12:40 - 1:10	Station #6 (Marsh Walk With Mini-Expedition) - conducted by volunteer
1:10 - 1:30	Super Citizen - closing with students conducted by staff or intern Clean-up by adults
1:30	Departure

The Trekking The Refuge field trips differ from the Wetland Round-Up field trips in the amount of staff time needed and number of students allowed on each field trip. For Trekking The Refuge field trips, the teacher checks out day packs filled with investigative equipment. One staff person hands out the activity equipment day packs at the beginning of the field trip and assists the adults in cleaning and counting the equipment at the end of the field trip. A maximum of 35 students (one class size) is allowed on each field trip. This policy limits the impact on the habitats, especially on the Tidelands Trail, where the whole class is trekking the trail for part of the day.

***Trekking the Refuge* Sample Schedule**

9:00	Bus arrives at the Refuge
9:15 - 9:30	Bathroom Break for students, 3 adults pick up and count equipment
9:30 - 9:50	The Bay Begins at Your Front Door Opening Discussion - conducted by educator
9:50 - 10:40	Trail Trekkers (whole group hike) - conducted by educator
10:40 - 11:10	Station #1 (Salt Marsh Safari) - conducted by school volunteer
11:10 - 11:40	Station #2 (Salt Pond Private Eye) - conducted by Refuge volunteer
11:40 - 12:10	Lunch
12:10 - 12:40	Station #3 (Salt Marsh Safari) - conducted by school volunteer
12:40 - 1:10	Salty's Search for a Habitat - Closing Activity conducted by educator; 3 adults return and clean equipment
1:15	Departure

Three on-site field trip activities have been chosen for the teacher by the EE staff. A classroom activity packet, checked out from our lending library, is mailed to the teacher two weeks before the field trip. It contains a slide show, color transparencies, a video, laminated posters, and laminated plant and animal pictures designed to complement the *Trekking the Refuge* guide.

With only one environmental education specialist stationed at the Education Center and only one at the Visitor Center, the high quality of the field trip program and the number of students served would not be possible without the help of Student Conservation Association interns and a few dedicated volunteers.

The interns and volunteers learn the basics of the Wetland Round-Up field trip program and lead the first rotation of a particular activity for each field trip. In addition, they conduct opening and closing presentations, and provide support to educators and parent leaders by answering any questions they have about conducting activities at the learning stations. When not busy with visiting school groups, the interns and some volunteers help the staff with special projects, such as designing activity props, writing closing activities, conducting pre-field trip slide show presentations, and developing new field trip activities, which enhance the educational experience for the students.

An Environmental Education Plan guides the Environmental Education Program. This Plan provides a direction for the Environmental Education Program and ensures implementation of the Plan's components as time and staff availability allows. The Plan is updated in the spring and fall of each year.

Resource Management Objective sheets show the connection between field trip activities, student behavior and the Refuge's resource management objectives and issues. During field trip orientations, educators and parents are introduced to our resource management objectives. Every activity that is developed relates to the Refuge's resource management objectives and a specific resource management issue, states what the Refuge staff is doing to resolve the issue, and gives ideas of what students can do to help the staff resolve the issue.

Reservations for the field trips were taken twice during the year. On the first day of reservations we took calls from 4:00 pm to 6:30 pm, to allow teachers time to get out of school and call us in the afternoon. Reservations for the Winter and Spring session, conducted February through July, began on December 2, 1996. Reservations for the Fall session, conducted October through December, opened on September 8, 1997. Using this type of booking schedule, we had minimal field trip cancellations.

People served by the Refuge Field Trip Program

	Environmental Education Center			Visitor Center		
	students	teachers	parents	students	teachers	parents
Wetlands Roundup	2424	123	617	3295	126	734
Trekking the Refuge	116	5	32	796	34	190
total	2540	128	649	4091	160	924

Adding the Wetland Round-Up and Trekking the Refuge field trips for both sites, a total of 8,492 people were served by the Refuge field trip program in 1997. In addition, 748 people visited the Refuge and conducted their own environmental education field trips, without involvement from our staff. An example of these non-Refuge conducted field trips would be visits by local college classes.

Environmental Education Center Field Trips

Most of the groups using the EEC for a field trip participated in the Wetland Round-Up

field trip program. 2,424 students, 123 educators, and 256 station leaders and 361 chaperones visited the site on this type of educator-led field trip.

Trekking the Refuge field trips at the EEC are staged out of the P.O.S.T. Learning Pavilion and take place in the same proximity as the Wetland Round-Up field trips. To minimize impact to the habitats and allow for the two field trip programs to run concurrently, a maximum of 35 students (one class) participate at a time. During the spring of 1997 only four Trekking the Refuge field trips were conducted at the Environmental Education Center, with 5 educators, 14 station leaders, 18 chaperones and 116 students participating. This program was in the testing stage to evaluate the field trip activities and the field locations they share with the Wetland Round-Up field trip program. Unfortunately, several of the activity locations were made unusable due to dredging and maintenance of the salt pond levees. Up to this time, Trekking the Refuge had been well received and educators were disappointed that the program was not available in the fall. Because activity locations will not be usable until the year 2000, Trekking the Refuge is not being conducted at this site until then.

The EEC was also used by various student groups not participating in either the Wetland Round-Up or Trekking the Refuge field trip programs. As a result of a cooperative effort with the City of San Jose, Environmental Services Department in 1996, in which Environmental Education Specialist Sandy Spakoff conducted a teacher in-service for 32 science teachers from the Eastside Union High School District, nearly 60 students and 7 chaperones had the opportunity to learn first-hand about where water goes. The program was modeled after the in-service which was comprised of a tour of the San Jose/Santa Clara Water Pollution Control Plant (Plant) and a staff-led presentation, including a guided walk and hands-on activities, at the Environmental Education Center. The presentation at the Refuge focused on how water discharged from the Plant has changed habitats and impacted wildlife, and what students can do to help reduce the 130 million gallon per day outflow from the Plant.

The following groups are also worthy of note: Santa Clara Valley Audubon Society brought 556 elementary school students, 21 educators and 65 volunteer leaders/chaperones to the EEC for their Wetlands Field Trip Program; George Mayne Elementary, the local elementary school in Alviso, conducted one family science night and one fifth grade evening program at the EEC with a total of 70 children, 25 parents, 9 teachers, and the principal participating; and at the other end of the academic spectrum, 117 college students from Mission, Evergreen Valley and DeAnza Colleges visited the site to learn about the importance of wetlands. Numerous other groups have used the EEC as well. Totals for "nontraditional" field trips (including the above mentioned groups) are 1047 students, 40 educators, and 96 leader/chaperones.

The combined totals for usage by all education groups at the EEC for 1997 are as follows: 3587 students, 168 educators, and 745 educator-recruited volunteer leaders and chaperones.

Visitor Center Field Trips

In addition to the Environmental Education Center, field trips occur at the other major visitor contact point, the Refuge Visitor Center. This site includes the Visitor Center building, the nearby Newark Slough Learning Center. The Wetland Round-Up field

trip program at the Newark Slough Learning Center completed its eleventh year at the end of 1997. One hundred twelve classes, 3,295 students, 126 educators, and 734 volunteer leaders participated. .

A pavilion and an old, former pump house serve as the hub for the daily field trip program. The pavilion, completed in 1992, is an important building for the Wetland Round-Up field trips; field trip opening and closing activities are conducted in the pavilion, along with some of the activity stations.

In the past, there has been a greater demand for the Wetland Round-Up field trip program than the staff was able to meet. Long waiting lists existed and many classes were turned away. Beginning in 1995, the Trekking the Refuge field trip program, which was designed to allow double bookings, was fully implemented. During 1997, there were no waiting lists for field trips and we were able to accommodate every educator that wanted to bring students on a field trip.

Trekking the Refuge field trips take place on the Tidelands Trail, a 1-mile loop near the Visitor Center, with a maximum of 35 students at a time. The program is designed for grades 3-6. These field trips are run entirely by educators and volunteer leaders. Educators lead the opening and closing activities with the entire class, and lead the class on a 45 -minute trail walk guided by observation questions in a bingo style format. Educators recruit 2 to 3 adult volunteers to lead three pre-selected, activity learning stations, and 2 to 3 adult volunteers to act as chaperones. All of the needed equipment for the opening and closing activities and learning station activities is in 4 day packs that the educators check out and carry with them.

There were 31 Trekking the Refuge field trips in 1997, with 34 educators, 190 leaders, and 796 students participating.

Adding together the Wetland Round-Up field trips and Trekking the Refuge field trips gives us a grand total of 4,091 students, 160 educators, and 924 school volunteers participating in educator-led field trips at the Newark Slough Learning Center.

Summer Day Camps

Day camps for local children were conducted during the month of July at both the Environmental Education Center and the Newark Slough Learning Center. The Refuge offered the camps free of charge. The environmental education specialists and interns cooperatively designed, planned and conducted both the Marsh-In camp at the Environmental Education Center and the Junior Naturalist camp at the Newark Slough Learning Center. The interns also assisted by adapting activities, making props, and setting up equipment. The interns, along with several volunteer leaders, enthusiastically led the campers through a variety of activities that included simulation games, guided imageries, wildlife observations, art projects, and share circles. There was a combination of large group and small group activities, with some amount of time spent each day at each small group's special spot. While at their special spot, campers had the chance to plan a skit, which was performed during the Thursday evening program.

The theme for 1997 was Super Eco-Heroes, where the campers became Super Citizens in training. Each day the campers received a mission at the Super Citizen Headquarters, to be completed with the help of the various Super Eco-Heroes: Super Solar Woman, Inspector Insect, Detective Slither, Water Wizard, Captain Comet, Planet Protector, and Super Citizen as they learned about the importance of protecting habitat for plants and animals of the San Francisco Bay. Through hands-on activities, stories, art, and exploration, campers learned about solar energy, photosynthesis, urban runoff, wetlands, native plants, reptiles, insects and spiders, aquatic creatures, and endangered species.

Campers visited a creek that ran to the San Francisco Bay and determined the health of the creek by what they found living in it. Each day, campers entered the "Super Hero Activator" which activated their super powers for learning about the environment. At the end of each day, campers sat in a circle and shared what they had learned. On the last day of camp, at graduation, campers became Super Citizens, keeping their super powers for life.

The sixteenth annual Marsh-In Summer Day Camp was held for one week at the end of July. The first day camp originated in 1981, with the intent of building rapport with the children living in the local community of Alviso. To help promote this year's camp, the on-site environmental education specialist, intern, and a Refuge volunteer presented a twenty-minute skit to 155 children who were attending summer school in the neighborhood. Apparently the effort was successful as the camp was attended by a record number of children -- a total of forty children, twenty of which were going into grades 1-3 and twenty were going into grades 4-6. This was the third year that younger children (grades 1-3) attended.

Whole group activities were designed to be appropriate for children of all ages. Small group activities were designed for either older or younger children, and conducted independently. Activities were led by two interns and four Refuge volunteers. The combination of enthusiasm and moderate leader-to-camper ratio allowed for the campers to receive a rewarding and memorable experience.

The five-day program included an overnight session. (Younger students did not participate in the overnight session.) As a result of the summer camp program the children living in Alviso have an increased awareness of the many factors that impact the habitats of the Refuge. Additionally, young persons who have participated in the summer programs have developed a greater sense of stewardship for the Environmental Education Center.

Junior Naturalist Camp, conducted at the Newark Slough Learning Center, provides children in the South Bay an opportunity to learn more about nature at the Refuge. The summer camp is advertised at local schools and libraries with flyers. Children must apply by sending a letter stating the reasons they want to become Junior Naturalists. One week of camp was held from July 21 to 25 for 15 students entering 3rd, 4th, 5th, and 6th grades. Whole group and small group activities were led by two interns, a summer youth employee and two Refuge volunteers. Junior Naturalist Camp takes place from 10:00 to 2:00 pm each day, except for Thursday, which is an evening program from 7:00 pm to 10:00 pm. The week was highly successful due to

the enthusiasm of the leaders. Campers learned about their local environment and had positive experiences in the outdoors.



Junior Naturalists, 1997

Seabird Restoration Education Program

The second year of this education program involved 407 students, fifteen teachers, and six schools in Pacifica, Montara, and Half Moon Bay. First through fifth grade students and teachers are working with seabird biologists to restore a common murre colony to Devil's Slide Rock along the Central California Coast. The restoration project is funded by a natural resource damage settlement resulting from oil spilled by the Apex Houston barge in 1986. U.S. Fish and Wildlife Service biologists from San Francisco Bay NWR Complex, with scientists from the National Audubon Society, Humboldt State University Foundation and the Biological Division of the U.S. Geological Survey are using murre decoys, three-sided mirror boxes, and a CD player that projects amplified murre calls to attract the birds and make the rock appear to be a thriving murre colony.

In 1996, a Seabird Restoration Education Program was approved and budgeted by the Apex Houston Trustee Council, made up of representatives from the Fish and Wildlife Service, the National Oceanic and Atmospheric Administration, and California

Department of Fish and Game. The program is being coordinated by Refuge Environmental Educators Amy Hutzler and Fran McTamoney.

During 1997, the program began with a workshop for eleven of the participating teachers, from six elementary schools. The workshop was conducted by Amy, along with Mike Parker, a restoration biologist, and Dr. Steve Kress, a National Audubon Society biologist. The workshop provided teachers with background information about seabird restoration projects and teaching materials.

Classroom presentations were conducted by Amy and Joan Telfer, a volunteer, after the workshop. Students were introduced to the restoration project and shown mirror boxes and decoys. In October, students were given the opportunity to participate in the restoration project after biologists had removed the 384 decoys from the rock and cleaned off the thick coating of guano. The decoys were in need of repainting, a perfect project for the students. They took the repainting very seriously and have demonstrated a strong tie to the restoration project, anxiously waiting for the decoys to be placed back on the rock. Classes will be kept updated on the number of murres visiting the rock through the school year.

The excitement of connecting teachers, students, parents, biologists, and environmental educators has truly made the Seabird Restoration Education Program successful. Teachers and students have taken a strong interest in the Common Murre Restoration Project. The education program will be repeated each year, until the goal of creating a murre colony is reached, an achievement in which the students can truly take pride.

H.3. Environmental Education - Teachers

In the San Francisco Bay Area, where many environmental education facilities and programs are available, the Refuge Environmental Education Program is unique. We provide a facility where educators lead their own field trips. As in previous years, we conducted trainings for educators (teachers, youth leaders and outdoor recreation leaders) and learning station leaders (parents, aides, grandparents, etc.) interested in participating in the Refuge's educator-led field trip programs. Following the training and guidance we provide, educators plan their field trip, prepare the students and adult leaders and conduct the field trip. By having educators fully responsible and highly involved in their field trip, they are more likely to integrate the classroom curriculum with their field trip activities, providing students with a learning environment which extends into the classroom beyond the day spent on the Refuge. As a result, students achieve a more meaningful, in-depth experience.

For the past several years, environmental education specialists at both sites have developed and maintained valuable relationships with several local schools. George Mayne Elementary, the local school in Alviso, annually conducts family science programs at the Environmental Education Center (EEC). At these programs, EEC Director Sandy Spakoff and teachers from the school work together to conduct activities that are both educational and entertaining. Many classes from Mayne School

also come to the EEC on field trips. In the fall of 1997, the environmental education specialist attended a faculty meeting where she presented an overview of the field trip program to new teachers who were unfamiliar with the Refuge and its programs.

Warwick Elementary School , which has adopted the Refuge and the endangered California Clapper Rail, worked closely with Amy Hutzal, the EE specialist at the Visitor Center, throughout the year. Teachers and parents attended workshops, and students came on field trips throughout the year. During National Wildlife Refuges Week, a special presentation about migratory birds and National Wildlife Refuges was put on by refuge staff and interns at the school for 125 students.

Amy Hutzal also worked closely with teachers and students at Hawes Elementary School in Redwood City. All of the teachers at the school, 26 total, spent a staff development day in October attending a special field trip orientation at the Visitor Center. During National Wildlife Refuge Week, presentations by Refuge staff and interns about migratory birds and National Wildlife Refuges were given to 235 students at Hawes. Later in October, nearly 450 students from Hawes came on Wetland Round-Up field trips to the Refuge.

Wetland Round-Up Field Trip Orientations and Planning

The majority of each field trip orientation is spent on background information and learning how to lead the activities found in the *Salt Marsh Manual, an Educator's Guide*. The logistics of planning a field trip, as well as rules and regulations, are also discussed during the workshops. By the end of the orientation, the educators and recruited volunteers understand that we are a resource management agency, the identity of our agency, and that each field trip activity is designed to meet the Refuge's resource management objectives. The staff is available for individual planning sessions should educators require assistance in planning their trips. A total of 13 Wetland Round-Up Orientation workshops were conducted at the Environmental Education Center in Alviso with 84 educators plus 125 educator-recruited volunteer leaders participating. A total of 9 Orientations were held at the Newark Slough Learning Center in Fremont with 100 educators and 70 volunteer leaders being trained and 4 educators returning for one hour planning sessions. The confidence gained by educators and volunteer leaders at these orientations culminated in successful field trips.

We continue to distribute the *Salt Marsh Manual, an Educator's Guide*. This curriculum guide was designed to facilitate discovery, learning, and enjoyment of field trips to the Don Edwards San Francisco Bay National Wildlife Refuge. In 1996 the guide was revised as the 4th edition and became two separate guides, one for each site, in order to focus more closely on the differences between the habitats. Each guide contains background information, area maps, planning and group management hints, classroom and on-site activities, and additional resource information. The additions to this revision include field trip openings and closings, Outstanding Volunteer Award sample, field trip emergency procedures, a learning assessment for educators to use for measuring what students have learned during this study unit on bay ecology, an activity for preparing students for the field trip, post trip activities

correlated to field trip activity sections on "Habitats, Bird Migration, Endangered Species and The Bay Begins At Your Front Door", and a chapter on "How Children Learn" that includes theme building, life skills, how the brain learns and learning theory. The design of the field trip activities was changed to a script format upon the suggestion of a parent leader. The "Read", "Ask", and "Do" format makes the field trip activities easier for the parent leaders to conduct. The activities in this guide are for grades K-8. The Educator's Guide is available free of charge to all educators and group leaders who attend a Wetland Round-Up Field Trip Orientation Workshop.



Interns explain Mini-Expedition during orientation

Trekking the Refuge Field Trip Orientations

During the field trip orientation workshops, the educators and parents learn how to conduct pre-selected openings and closings, a trail walk or discovery walk, and three to five learning station activities depending on the site chosen for a field trip. The logistics of planning a field trip, as well as background information, policies and rules, are also discussed during the workshops. By the end of the orientation, the educators and parents have a understand that we are a resource management agency, the identity of our agency, and that each field trip activity is designed to meet the Refuge's resource management objectives. Because Trekking the Refuge is an entirely educator-led field trip, the workshop is essential to the success of the field trip. In 1997, 8 orientations were held for 36 educators and 28 volunteer leaders.

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The *Trekking the Refuge Educator's Guide* includes:

- An introduction to the Refuge
- Background information on habitats, plants, and animals
- Pre-visit preparation hints
- Classroom activities with resource management objective and issue information
- Field trip activities: opening and closing activities, a walk, and learning station activities.

A pre-visit packet with materials such as a slide show, color transparencies, a video, laminated posters, and laminated plant and animals pictures complements the Trekking the Refuge guide.

In the Marsh on Mare Island

In addition to their other accomplishments, Amy Hutzel and Fran McTamaney developed a complete, new, field trip program at San Pablo Bay NWR. The first field trip was held on that satellite refuge on December 19.

A new field trip program was developed for San Pablo Bay NWR during 1997. *In the Marsh on Mare Island* is an educator-led, hands-on, field trip program for grades K-8, modeled upon the program at Don Edwards S.F. Bay NWR. The program will serve North Bay schools with a high quality education program, a much needed resource in a rapidly growing area. The program takes place on the former Mare Island Naval Shipyard, which the Navy deactivated as a result of the Base Closure and Realignment Act of 1993.

The development of the program began with a rough draft of an educator's guide, followed by meetings with local teachers. The educator's guide, which includes field

trip planning information, field trip activities, and background information on San Pablo Bay itself, was revised after the meetings thanks to comments and ideas from teachers.

Three Field Trip Orientation workshops for over 40 teachers were held on Mare Island in 1997, two as part of Save San Francisco Bay Association's Summer Institutes for teachers. The four-hour orientations introduced teachers to the field trip activities and the logistics of planning a field trip. Each teacher received the first draft of the educator's guide.

The first field trip was held on December 19 for 38 students at the old base exchange building, which is planned as the future site of the visitor center, EE center, offices and bookstore for San Pablo Bay NWR. The Navy is currently leasing to the Fish and Wildlife Service, at no cost, the area around the building for use by field trip groups.

Educational Resources

The Audio Visual Lending Library for the Environmental Education Program exists at both sites. VHS videos are available for educators to check out for 2 to 3 week periods.

It's Wet, It's Wild, It's Water! is an up-to-date look at water conservation and pollution prevention issues for South Bay area students in grades three through eight. The viewer learns where water comes from and where it goes by traveling to the Sacramento-San Joaquin River Delta and the San Jose/Santa Clara Water Pollution Control Plant with student reporters. The video underscores our connection to our watershed, with emphasis on how students can actively prevent water pollution and help protect our environment.

Who Did the Owl Eat? depicts a barn owl's hunting and eating habits, regurgitation of an owl pellet and directions on how to dissect a pellet. Appropriate for grades first through sixth, the video is accompanied by charts, curriculum, and script. Educators are encouraged to copy the tape and charts to keep in their school curriculum library for future use. Other refuges have copied the tape to lend out to educators.

The 25 minute video about the San Francisco Bay and Delta, *Secrets of the Bay*, shows the history of the bay and its sometimes conflicting interests. This video is appropriate for fourth grade through college.

Fabulous Wetlands is an 8-minute video that takes a humorous, yet informative look at wetlands, what they are, how important they are, and what we can do to protect them. Perfect for pre-field trip preparation, this video is appropriate for third grade through high school.

A Home for Pearl and accompanying guide is a video that teaches about wildlife habitats. It is divided into four parts: two 15 minute segments and two 20 minute segments. Each can be viewed as a separate unit incorporating supplementary activities provided in the guide. It is appropriate for first through sixth grades.

Do your Part! is a 19 minute video featuring students teaching each other what they can do to help preserve the wetlands. It is appropriate for grades 3-8.

In Celebration of America's Wildlife is a 28 minute video that features success stories in wildlife conservation. It is appropriate for grades four through adult.

The Surfer, the Garbageman, and the Lady in the Sky, is a 15 minute video featuring a high school student sleeping in class and dreaming about pollution of soil, air, and water, and ways to prevent pollution. It is a fun, fast-paced video for grades 4-8.

Into the Wild is a video divided into three segments, each focusing on one endangered species and the efforts being undertaken to help the species. The featured species are: whooping cranes (12 minutes), red wolves (12 minutes), and whales (16 minutes). recommended for grades 3-6.

Tinka's Planet is a 12 minute video that introduces children to the need for recycling. It's very good for grades K-3.

Water You Doing? is divided into five, six minute segments that cover water quality in Puget Sound in a fun and informative style. The issues are very applicable to the San Francisco Bay. It is recommended for grades three through eight.

In addition to classroom videos, several training videos are available through the Audio-Visual Lending Library. Educators can show the videos to adult leaders as training for an upcoming field trip. These training videos consist of background and "how to" information and footage of the activity during an actual field trip.

Wetland Round-Up Field Trips at the Visitor Center
Brine Shrimp Lab at the Environmental Education Center
Brine Shrimp Lab at the Visitor Center
Mud Creature Study at the Visitor Center

In addition, the Refuge developed a new training video, *Mini-Expedition at the Visitor Center*, thanks to a grant that our cooperating association received from Chevron.

Educator Workshops

The environmental education staff, Fran McTamaney, Sandy Spakoff, and Amy Hutzel, conducted and attended several environmental education workshops in 1997.

Resources in Environmental Education Fair

The Resources in Environmental Education Fair (REEF) workshop was held in March, 1997. EE Specialists Sandy Spakoff and Fran McTamaney and SCA interns attended and distributed Refuge information. Sandy Spakoff and Tamera Gilbert from the City of San Jose Environmental Services Department co-presented one 45-minute workshop session on watersheds and the impacts of nonpoint source pollution on habitats and wildlife.

Santa Clara Unified School District

Several schools participating in the field trip programs at the Environmental Education Center, including George Mayne School in Alviso, belong to the Santa Clara Unified School District. In June 1997, EE Specialist, Sandy Spakoff, presented two 90-minute

workshops for teachers at their annual Math and Science Academy. An introductory slide show focused on science and salt marsh ecology; after which she conducted hands-on activities that teachers could duplicate in their classrooms.

Making Waves on the Bayshore: Summer Institute, July 21-25

This week long institute was conducted by environmental education specialists from the Refuge, the Bay Model Visitor Center in Sausalito, the Randall Museum in San Francisco, and from Richardson Bay Audubon Center in nearby Tiburon. Educators, grades 4-8, were provided with learning activities and resources to help students experience their local watershed environment and understand its connection to the Bay. Fourteen educators attended the institute. Fran McTamaney and Sandy Spakoff represented the Refuge.

Project WET Facilitator Training, August 12 - 13

Judy Wheatly from the California Water Foundation presented facilitation training at the Environmental Education Center. Sandy Spakoff and Fran McTamaney assisted with the training.

Kids in Marshes, Aquatic Outreach Institute, October 25

Debi Tidd and other educators from Aquatic Outreach Institute presented the first Kids in Marshes workshop at the Visitor Center on Saturday, October 25, from 9:00 am to 5:00 pm for 25 teachers. Amy Hutzel met several times with Debi before the workshop to plan activities and orient Debi to the site and the marsh. During the workshop, Amy lead mud studies and plankton lab, and gave an introduction to the Refuge's field trip program. Aquatic Outreach Institute has been conducting a Kids in Creeks program for several years and is just beginning their Kids in Marshes program. A second workshop is planned at the Refuge Visitor Center in 1998.

Canoes in Sloughs Teacher Institute, Save San Francisco Bay Association, July 14 - 18 and July 28 - August 1

Save San Francisco Bay Association coordinated and conducted two summer institutes in July, focusing on San Pablo Bay. Save the Bay worked with several other agencies, organizations and individuals, including the U.S. Fish and Wildlife Service, the Army Corps of Engineers, local farmers, environmentalists, and research biologists, to plan and present the Institutes. The majority of each week was spent on the water in canoes, learning the natural history of San Pablo Bay and traveling through the watershed. One day each week was spent on Mare Island, where Fran McTamaney and Amy Hutzel, along with Refuge Manager Betsy Radtke, conducted a field trip orientation for the new environmental education program at San Pablo Bay National Wildlife Refuge. Thirteen teachers attended the first week and sixteen attended the second week. Several of the participating teachers are planning on bringing field trips to Mare Island.

Educational Courses, Programs, and Organizations -- The environmental education personnel were involved in varying degrees with the following courses, programs, and committees.

National Conservation and Training Center (NCTC) Courses at the Environmental Education Center – In January, 25 Service personnel learned how to use specific tools for evaluating education and outreach programs while attending *Education Program Evaluation*. In September, 30 Service personnel learned more about the National Environmental Policy Act while attending *Integrating NEPA into Fish and Wildlife Service Activities*.

NCTC Courses at other locations – Environmental Education Methods - Rocky Mountain Arsenal NWR April 7-11. The objective of the course is to work with formal and non-formal education groups in addressing Service issues and encouraging environmentally responsible behavior by young people. Service employees are introduced to general education practices and encouraged to work with local schools and youth organizations in project development. Fran McTamaney and Gary Tucker of NCTC designed and co-lead this course. Sandy Spakoff assisted, along with other Service personnel. Twenty-two participants attended.

Public Outreach, Advocacy and Education: Overview and Planning March, Leetown, West Virginia, and June, Albuquerque, New Mexico. Participants learned about education and outreach strategies and how these strategies could help achieve resource management objectives of the Service. Fran McTamaney presented the session entitled *Strategies That Work! San Francisco Bay National Wildlife Refuge*, showing how each activity conducted at the Refuge met a resource management objective. Twenty-five participants attended each course.

Regional Outreach Planning and Evaluation Model Team – with Federal Aid, Region 1 - September 9-11. Fran McTamaney and Sandy Spakoff helped design a step-by-step, easy to follow outreach model. The model is presently being field tested; formatting and field testing will occur in 1998.

California Aquatic Science Education Consortium – In 1990, a consortium of agencies, organizations, and citizen groups was established for the purpose of encouraging, supporting, and enhancing aquatic (fresh and marine) education programs for informal groups in the State of California. Five aquatic curriculum guides were developed: Plastic Eliminators, Water Inspectors, Fresh Water Guardians, Wetland Protectors and Creek Watchers. These guides were reprinted in 1997 and are available for sale. The Environmental Education Program coordinator is the Refuge representative to the Consortium. The environmental education staff uses activities from these guides when conducting educator workshops on and off-site.

Santa Clara Valley Environmental Partners – EE Coordinator Fran McTamaney served with this group of environmental educators from Santa Clara County to promote environmental education in the South Bay, and to produce an annual environmental education fair for teachers. The purpose of the event is to let teachers know what environmental education programs and resources are available locally. The goal is to bring environmental educators and teachers together to teach the next generation of students about the importance of preserving and protecting our natural resources.



Environmental Education Center Director Sandy Spakoff spent many hours during 1997 working with educators.

Midpeninsula Environmental Education Alliance – Fran worked with this informal group of EE agencies and organizations located in Santa Clara and San Mateo counties to provide a forum for collaboration among environmental educators to maximize resources and achieve common goals. During 1997, the group shared expertise about volunteer training, grant writing, program planning, monitoring and assessment, entrance fees, environmental education activities, researching a WEB site for the association, etc.

Watershed Mapping –In 1996 a watershed map committee was formed with members of local municipalities and organizations to provide a versatile tool for educating school children and the public about the watershed of the Santa Clara Valley. During 1997, Environmental Education Specialist Sandy Spakoff served as the chair of this committee.

In December, Sandy acquired contributions from the three South Bay water pollution control plants to fund the first phase of the three-phase project, which will ultimately

provide excellent new teaching tools about our local watersheds for both agencies and educators. The committee will receive \$2,000 from San José-Santa Clara WPCP and \$1,000 from both the Sunnyvale and Palo Alto water pollution control plants.

The project is outlined as follows:

Phase	Description	Duration	Estimated Cost
Phase I	Production of a prototype map, to be used in fundraising	12 - 14 weeks	\$4,000.00
Phase II	Completion of watercolor map of Santa Clara Basin Digitization of map Prepress film work Printing of 15,000 - 24 x 36 in. maps and 50 - 36 x 48 in. maps Distribution to teachers and environmental education centers	12 weeks 3 - 4 weeks	\$30,000.00
Phase III	Enlarge and enhance local creek watershed maps as requested	To be determined	To be determined

Using the Phase I prototype map, which will show both the color and perspective of the final map, members of the committee plan to raise funds from Santa Clara Valley foundations, nonprofit organizations, and businesses for the production of the final map. At this time we are not budgeting for Phase III.

Pavilion Mural – Cargill Salt Company donated \$3000 to San Francisco Bay Wildlife Society, the Refuge's cooperating association, to produce a mural in the Newark Slough Learning Center Pavilion. Muralists were chosen by a committee made up of representatives from Cargill, San Francisco Bay Wildlife Society, and DESFBNWR. Sean and Patrick Johnson, the muralists, designed a mural depicting refuge habitats and wildlife; the design also underwent committee review. The beautiful mural was unveiled at a ceremony on Earth Day, April 26, and has become a focal point in the Newark Slough Learning Center field trip program.



Muralist Patrick Johnson unveiling the new mural in the Pavilion
at the Newark Slough Learning Center

H.4. Interpretive Trails

The Refuge has two trails with interpretive wayside exhibits. These displays describe the habitat, the cultural history, the ecological dynamics and geology of the areas that visitors walk through. They are entertaining, easy to read, visible without being intrusive and serve as an important supplement to our interpretive effort.

The self-guided trails are especially important during hours when the Visitor Center is closed. Before 10 am, and from 5pm to sunset, trail use is sometimes heavy. Refuge volunteers patrol the trails, talking with visitors and providing more information to people as needed. They also pick up trash and make note of the wildlife they see.

The Refuge's main interpretive trail, the Tidelands Trail, is registered as a National Recreation Trail in the National Trails System.

Other trails on the Refuge are heavily used by visitors, and serve the public as sites for interpretive programs. The Mallard Slough Trail was well used, despite the trail closure due to the salt company levee maintenance beginning in August, 1997. The dredging of the adjacent salt pond closest to the EEC resulted in three to four feet of fresh mud on the trail, preventing its use by visitors.

H.5. Interpretive Routes Nothing to report.

H.6. Interpretive Exhibits, Demonstrations, and Special Events

During 1997, 103,795 visitors participated in interpretive activities at the Refuge. Of these, 99,767 took advantage of our self-guided interpretive trail, viewed exhibits, or visited the Visitor Center or the Environmental Education Center to watch films or videos and look at the educational displays. The remaining 4,028 participated in the numerous naturalist-conducted programs such as walks, van tours, talks, slide presentations, astronomy programs, or bicycle trips.

Every day brings a steady stream of inquisitive Refuge visitors past our Visitor Center reception desk. On weekends, the Environmental Education Center also receives drop-in visitors. Our volunteers who staff the desk daily are knowledgeable and always willing to help out. We would not be able to present the variety of programs we do without them.

The natural history of the Refuge was well represented in our 1997 programs with topics such as salt march ecology, birds, seasonal wetlands, endangered species, edible plants, geology, water pollution, mammals, dinosaurs, native Americans, and astronomy. Our volunteer staff was quite active during 1997, giving 99% of our weekend public tours and interpretive programs. A number of programs of importance were given by local experts, including the geological history of the San Francisco Bay and the Endangered Species Act, and were well attended by the public. For complete descriptions of these programs, look in the calendar section of the *Tideline* newsletters included at the back of this narrative.

Our program audiences were as diverse as the program topics that were presented. Audubon chapters, day care centers, garden clubs, historical societies, scout troops, community groups, senior centers, teachers' associations, and college classes among many others, took advantage of the available programs. The greatest demand for naturalist-led activities, however, came from families.

As in past years, one of the most popular activities during 1997 were the tours of Drawbridge, an abandoned hunting and fishing community in a salt marsh setting. The dilapidated town stands as a reminder of the consequences of human destruction of the native environment. This was the theme as more than 450 people visited the area during tours offered on Saturdays from May through October. Other weekday and weekend tours were arranged by special request for walking clubs, photography groups, and other organized groups.

Throughout the year, staff members spoke to numerous civic, business, church, and social groups, and participated in career fairs for high school students providing nearby communities a service while disseminating information about the Refuge and its resources.

Many off-site events helped to increase recognition of the Refuge and its programs. Staff members and volunteers attended information booths at these events, where they distributed literature and in some cases led environmental education activities, reaching over 5,000 people. The Bay Area Environmental Education Resources Faire for K-12 educators, the Santa Clara Audubon Society Education Day, Berkeley Bay Day, and many other special events all provided opportunities for the Public Use staff and volunteers to reach out to the public.

National Wildlife Refuge Week -- During the celebration of National Wildlife Refuge Week, October 11 through 18, two environmental education specialists and two environmental education interns visited schools and gave presentations to students. The main goal of the visits was to inform students about migratory birds, wetlands, and National Wildlife Refuges. In addition, the presentations provided an opportunity to advertise upcoming National Wildlife Refuges Week events, such as Shark Day.

The presentations were given at Warwick Elementary School in Fremont, Hawes Elementary in Redwood City, and Lowell Elementary in San Jose, to a total of 519 students. The two interns designed the presentation, which focused on migratory birds of the Pacific Flyway. Each presentation began with a slide show about migratory birds that use the San Francisco Bay. A skit followed, with the students becoming different birds and migrating to San Francisco Bay, where their habitat was protected in a National Wildlife Refuge, thanks to the hard work of Super Citizens.



Intern Sharon Kamin put the kids through their paces

during National Wildlife Refuge Week.

Most of the Refuge's National Wildlife Refuge Week events were held on the Refuge. The week began with Shark Day at the Environmental Education Center. California Academy of Sciences brought shark specimens, including live swell sharks, to introduce visitors to the fascinating adaptations of sharks. In guided marsh walks, visitors participated in activities that demonstrated how marshes around the bay help make this area an important Leopard Shark and Brown Smoothhound nursery. They also learned about the important responsibility that each individual has to maintain the area as a safe nursery by preventing urban runoff pollution. In a Shark Protectors program participants used the Flows to the Bay model to see that pollutants flow directly down storm drains into the closest body of water. They used specialized puppets of a shark, fish, and other bay organisms to simulate the food chain and see that urban runoff pollutants can accumulate to harmful levels through the food chain. Visitors learned that each individual can help prevent pollutants from accumulating to harmful levels by preventing urban runoff pollution. Participants made Shark Protector buttons to take home which were designed to spark conversations with their friends and family about what they learned in the program.



Visitors petted the sharks on Shark Day.

There was also a variety of ongoing activities. Visitors learned about what local sharks eat while playing a shark toss game, and painting t-shirts using stencils of local sharks and their bay organisms that they eat. Some of the myths which lead to fear of sharks

were dispelled through a shark scavenger hunt. Visitors also made necklaces with shark tooth replicas. All in all, visitors had a great time learning a lot about sharks, and how the Refuge helps provide healthy habitat for them.

National Wildlife Refuge Week culminated on October 18 with a celebration of the Refuge's 25th anniversary. The celebration began with a ceremony in the Refuge's Newark Slough Learning Center, and involved Rick Coleman, the Fish and Wildlife Service Chief of the Division of Refuges, numerous local and national dignitaries, present and past project leaders, and current Refuge staff members, each speaking for a few minutes. The ceremony ended with the dedication of a restored marsh which was named for the leaders of the Citizens Committee to Complete the Refuge.

Following the ceremony, everyone repaired to a tent where food and wine were served, an auction was held, and the San Francisco Bay Wildlife Society announced the beginning of a major fund raising campaign. The day was a fitting recognition of 25 years of accomplishments, and celebration of the start of the Refuge's second quarter century.



The Refuge's twenty-fifth anniversary was celebrated during National Wildlife Refuge Week. Our birthday cake was decorated with an image of the endangered California clapper rail.



Volunteer Renee Fitzsimons prepared the sign up table for the auction. The auction's center of attraction was a commissioned painting of the endangered California clapper rail (below).



Bay Area Environmental Education Resource Fair -- On Saturday, January 11, at the Marin Civic Center in San Rafael, three environmental education specialists and one volunteer attended the popular Bay Area Environmental Education Resource Fair. The focus of the fair was to bring people closer to the resources and issues surrounding our natural world. It provided science and ecology workshops and exhibits for educators. The staff and volunteer worked at a booth, handing out refuge information (such as refuge brochures, *Tideline*, EE brochures, etc.), selling items from the bookstore, playing the "Salt Marsh Survival" board game with visitors, and talking to educators about refuge EE resources. The Migratory Bird display from the Regional Office was the beautiful backdrop for the Refuge booth. Staff attended several of the workshops offered at the fair and visited other organizations' booths.

Santa Clara Valley Audubon Society Education Day -- On Saturday, March 8, volunteers attended the Santa Clara Valley Audubon Society Education Day, where they led bird activities and informed the public about the Refuge. The focus of this fair was on environmental education programs for K-6 students, parents, and teachers. The event was held at the Santa Clara Valley Audubon Society headquarters.

Redwood Environmental Education Fair -- Annually, environmental educators and volunteers from the Refuge prepare for and conduct the EE presentations and activities at the Redwood Environmental Education Fair in Humboldt County. This year, one Refuge EE Specialist and two Refuge interns participated, supporting Humboldt Bay NWR which does not have a public use staff. Four classes of approximately 30 students each attended the four refuge sessions. The students were all in fourth or fifth grade. Each session was 45 minutes long, which included a ten minute opening discussion, two 15 minute activities, and a five minute closing discussion.

The title of the session was "Refuges - McDonalds of the Flyways." The staff person and interns led a discussion about the importance of wetlands for migratory birds, and the role of refuges in protecting wetlands for migratory birds. From the window of the room, Humboldt Bay NWR was pointed out to the students. The students then had the chance to taste pickleweed collected at the Humboldt Bay NWR and to see eelgrass, an important food for black brandt. The classes were then split into two groups of about 15 students each, to allow more personal contact with the students. Each group participated in both Not-So-Trivial Migratory Bird Pursuit (a *Jeopardy!* style game with questions about wetlands and migratory birds) and Migration Headache (a simulation activity in which students become black brandt and migrate from Alaska to Humboldt Bay). A wrap-up discussion at the end focused on how students could help protect wetlands. The presentations met Humboldt NWR's resource management objective that promotes understanding of the importance of wetlands and the need to preserve and restore wetlands for migratory birds.

Forest Conservation Days - On March 17 and 24, two environmental education interns participated in Forest Conservation Days in the nearby community of Saratoga. Forest Conservation Days is designed to increase awareness, knowledge, and appreciation of natural resources and their management and increase understanding of forestry and the role of foresters in resource management. The event lasts two weeks, and involves nearly 3,000 Bay Area 5th grade students. The students rode buses and

spent a half day at the event. The interns acted as hike leaders, taking groups of 20 students at a time on a two-hour, 1/2 mile hike.

Snowy Plover Exhibit in the Visitor Center -- Amy Hutzler designed and installed a temporary exhibit in the Visitor Center to provide information about the annual closure of Marshlands Road to protect Western snowy plovers. Snowy plovers are threatened shorebirds that nest alongside the road. A management decision was made to close the road during the breeding season to prevent chicks that wander onto the road from being run over. Marshlands Road leads to a fishing pier at the edge of the Bay. The exhibit answered the question: "why is Marshlands Road closed to cars?" A photograph of a well-camouflaged chick on Marshlands Road was used to reinforce the importance of closing the road. The exhibit will go up each April before the road is closed.

Earth Day -- The 27th anniversary celebration of Earth Day was held at the Refuge on Saturday, April 26. The day began with a community litter cleanup, and continued with bicycle tours, nature walks, hourly programs on endangered species, and other interpretive activities. Children's events such as puppet shows, Endangered Species Jeopardy, Native American Storytelling occurred throughout the day. One highlight was the awards ceremony for the Refuge's annual Endangered Species Poster Contest.



A Sale of Native Plants was held on Earth Day, 1997.

Meanwhile, in the Native Plant Nursery, a Sale of Native Plants brought home horticulturalists to the Refuge. Volunteers sold several hundred species of native plants. At noon, the Refuge dedicated a new mural in the Newark Slough Learning Center. The artists were there as their beautiful work of art was unveiled. The mural depicts the habitats and wildlife of the Refuge, and will be used in the environmental education program. Earth Day was a great success (Please refer to the flyer at the back of this narrative.). Over 500 people attended .

Endangered Species Poster Contest -- The Annual Endangered Species Poster Contest, held in conjunction with Earth Day, encourages elementary students to study and discuss endangered species in class, and then create posters to illustrate their feelings about their favorite endangered species. Announcements sent to every public and private elementary school in Newark, Fremont, and Union City brought in hundreds of creative posters, many of excellent quality that conveyed very important messages about conservation of endangered species. First place winners and their parents received entry passes to the Monterey Bay Aquarium; second place winners and their parents received passes to the San Francisco Zoo; and third place winners and their parents received passes to the San Jose Childrens Discovery Museum.



Several winners of the Refuge's Endangered Species Poster Contest inspected their free passes.

National River Cleanup Day -- The Refuge organized a cleanup along Los Gatos Creek in Campbell on May 17. It is the first year that the Refuge participated in this cleanup event. Despite the above 100° F heat, 57 volunteers removed 55 bags full of trash weighing approximately 300 pounds. Some of the volunteers also rebuilt watering wells around native vegetation to help it get better established along the Los Gatos Creek Trail.

California Coast Cleanup Day -- The Refuge organized a cleanup along Saratoga Creek in Santa Clara in celebration of California Coast Cleanup Day on Saturday, September 20. Forty two volunteers removed 95 bags full of trash from 1 mile of Saratoga Creek. The trash weighed approximately 1,000 pounds and filled a 6 yard garbage dumpster. Refuge volunteers and staff were on hand to register volunteers, distribute bags, drive vehicles and do everything else needed to make the cleanup a success. This was the only site coordinated this year due to a temporary vacancy in the volunteer coordinator position.

Kids Day was a popular special event held in February with approximately 200 participants. Visitors colored their own bird identification books and then looked for the birds from their books outside on a guided walk. Participants were fascinated by the live native wildlife presented by Sulphur Creek Nature Center. In a Salt Marsh Mystery Adventure participants learned about why the salt marsh harvest mouse has become extinct and about how to help protect its remaining habitat by conserving water. Visitors explored life in the marsh in a guided Marsh Walk. There were also butterfly crafts, a lab to investigate water organisms, a craft activity about the salt marsh harvest mouse and its habitat, and Ohlone Indian activities.

International Migratory Bird Day -- Coyote Creek Riparian Station, Santa Clara Valley Audubon Society, and San Francisco Bay Bird Observatory produced this major interpretive event with the Refuge this year. Activities were offered at both the Environmental Education Center and Coyote Creek Riparian Station in Alviso. Over 400 people attended.

The most popular attraction was Sulphur Creek Nature Center's presentations of live, local birds in which participants got to touch the birds while learning about each species. A nest box building activity was also particularly popular. Visitors assembled Western Bluebird nest boxes in an effort to help their declining population recover. Some of the visitors donated the boxes to the National Bluebird Recovery Program which is locally led by Santa Clara Valley Audubon Society, and others took them home to place in their yards. Many people enjoyed a Beginning Shorebird Identification Program in which participants first how to identify shorebirds and how scientists estimate their populations. On a guided walk afterwards visitors participated in a shorebird count to be posted on the Internet where people will track a variety of migratory birds. Visitors observed a wide variety of migratory birds on nature walks, and a Refuge biologist showed slides that interpreted her experience with restoration activities for the Snowy Plover.



Bluebirds will benefit from the nest boxes built at the Environmental Education Center during International Migratory Bird Day.

There were many ongoing activities throughout the day. In a migration game visitors learned about the obstacles that birds must overcome to complete migration. In a mud studies lab visitors used sieves to find the tiny creatures which migratory shorebirds eat. Visitors also made migratory bird mobiles, painting examples of local migratory birds and forming them into 3 dimensional decorations. Other highlights included a migratory bird poster contest award ceremony, a bird watching tour on bike, displays from Ohlone Audubon Society and San Francisco Bay Bird Observatory, and a migratory bird toss game. Throughout the day as visitors gained an appreciation for the migratory marvels, they learned how each individual can help protect the birds by preventing urban runoff pollution to protect local habitat, and by purchasing organic coffee to help prevent pollution in wintering habitats.

The *Halloween Party* at the EEC in October was attended by 75 people from the community of Alviso. This special event included many activities related to animals typically associated with Halloween, incorporating the importance of preventing urban runoff pollution to protect them. In a Beginning Bird Walk for Kids participants colored their own bird identification books while learning about the "creepy crawlies" that different birds eat, and then used their books to find the birds on a guided walk. In a presentation by the Bay Area Amphibian and Reptile Society, visitors learned about a variety of snakes up close and personally. Many visitors were thrilled by the chance to

touch the live snakes! In a Bat House Workshop participants constructed bat houses to take home to try to attract declining populations of bats. They learned that attracting bats is a great alternative to using pesticides since they naturally control large numbers of garden and crop pests. There were also many ongoing activities. Visitors learned how important it is to prevent urban runoff pollution in order to protect our creeks and bay as they played a storm drain pollution scavenger hunt. Visitors made origami owls and finger print insects. In a spider web toss game participants learned about how spiders help control insect populations. Visitors also learned what the water birds eat in the marsh while playing a fishing game.



These kids constructed a bat house at the Halloween Party.

Duck Day for Kids -- This workshop about ducks was designed for families. Participants colored their own duck identification books and then used their books to identify the ducks in a Beginning Duck Walk. Visitors collected a sample of water from the slough for an indoor lab to observe the tiny water organisms that the ducks eat. They also painted dough duck decorations.

Ohlone Indian Workshop -- In this program guest speakers interpreted the history and present day culture of the Ohlone, the Indians who lived in San Francisco and Monterey Bay Areas. An Ohlone descendant shared his family history and told traditional stories, and an archeologist discussed his research in the area and demonstrated flint-knapping. Afterwards visitors used tule to make their own duck decoy or miniature boat. Throughout the workshop participants saw that the Ohlone

had great reverence for the natural resources that sustained them, and took special care to protect them. They learned that we can carry on that tradition of protecting the area by preventing urban runoff pollution.



Visitors made tule boats and duck decoys
at the Ohlone Indian Workshop.

Smithsonian Anniversary Presentation -- The Environmental Education Center hosted this program in honor of the 150th anniversary of the Smithsonian Institution. The Director of the Native American collection at the National Museum of Natural History presented "Heartbeat: Music Traditions of Native American Women." Visitors got to hear samples of traditional and contemporary Native American music by women from a recent Smithsonian recording. Visitors also learned about the different roles that the music plays in Native American cultures

Off-Site Special Events

Earth Day at Prusch Park -- This event was held on April 19th at Prusch Park in San Jose. This was the first time that the City of San Jose coordinated the event. Refuge volunteers led a migratory bird toss game to teach visitors about some local migratory birds, and to advertise International Migratory Bird Day. They also handed out brochures and talked to visitors about the Refuge.

Environmental Health Fair -- The Silicon Valley Toxic Coalition coordinated this fair in Alviso on June 28. Refuge volunteers led guided walks to show visitors the variety of wildlife dependant on bay habitats. Visitors also played a pollution prevention toss game, learning how each individual can protect the habitats by preventing pollution through storm drains. In addition, a Salt Marsh Harvest Mouse board game was set up to teach visitors about this local endangered species and the habitat upon which it depends.

Interpretive walks and talks

Bird Walks -- The most frequently presented programs were guided Bird Walks. These two-hour-long walks usually took place in the morning with an average of 10 to 20 participants. Most bird walks were a general survey of the bird population, while others focused on a particular group of birds such as shorebirds, or parent birds. Most people that attended the walks were new to birding, and enjoyed the opportunity to learn about the bird species of the Refuge. Sometimes a sample of mud or water was collected and observed to see examples of organisms that the birds eat.

Butterfly Wonders-- These interactive programs included indoor presentations and guided walks. Visitors were introduced to local butterflies and their adaptations, and to the native plants that they depend on. Tips were given for attracting butterflies to gardens, and preventing pollution from pesticides, by spreading a layer of mulch to deter non-native vegetation, and removing what remained by hand. In addition, workshops were given about how to monitor butterfly gardens, noting which plants were successfully attracting butterflies, and how the butterflies were using the plants.

Protectors of the Bay programs: the Puppet Show Mystery and Hike and the Map Adventure -- These interactive programs showed how each individual can protect our creeks and bay by preventing urban runoff pollution. The Puppet Show Mystery and Hike began with a puppet show. It portrayed life in a healthy river and bay which suddenly became polluted. The characters searched to find a way to stop the pollution. Participants helped tell the story with the puppets and contributed their ideas for preventing pollution. Afterwards participants went on a guided walk to see some of the habitats and wildlife that would be affected by urban runoff pollution. In the Map Adventure visitors traced the actual path of a local storm drain to see that storm drains flow directly to the nearest waterway without treatment. Along the way participants removed litter and stenciled a storm drain to educate others about the importance of preventing storm drain pollution. Afterwards participants painted their own t-shirts, an activity designed to spark conversations with their friends and family.

Evening Programs -- Several different evening programs were extremely popular. In Twilight Hikes visitors observed the diversity of life dependant on wetland habitats, and learned about the important ecological roles that they play in the Bay Area.

Visitors interested in astronomy participated in our "Starstruck!" night programs, which begins with a slide show and lecture on the visible stars of that night. Afterwards, participants move outside and use telescopes to view the stars they learned about during the lecture. The volunteers leading this program provided high-end telescopes for special viewing opportunities, and participants also used their own telescopes. The Hale Bopp Comet Watch and Perseid Meteor Watch programs included an indoor presentation and outdoor activities. They began with presentations about the origin of comets and meteors with a comet simulation activity, and continued outside with astronomical viewing with a telescope and binoculars, and a guided hike to investigate the local habitats and the wildlife dependent on them.

Beginning Birding and Duck Identification Workshops -- These programs were designed to help people get started bird watching. They began indoors introducing birds frequently seen at the Refuge. For adult audiences, this was done with a slide show and lecture; youthful audiences colored their own identification books. Afterwards visitors went outside and practiced their new identification skills. The Beginning Birding Workshop focused on a wide variety of local birds. The Duck ID Workshop focused on ducks.

Thanksgiving Salt Marsh Walk -- This guided walk included activities in the salt marsh to demonstrate the many reasons there are to be thankful for salt marshes around the San Francisco Bay. Afterwards visitors used the Flows to the Bay model to see that each individual can help protect salt marshes by preventing urban runoff pollution.

Lizard and Snake Search -- This program introduced visitors to local reptiles. On a guided walk visitors learned about their unique adaptations and important role in the food web while watching Western Fence Lizards and searching for the more elusive Gopher Snakes, rubber Boas, and Garter Snakes.

Decorating For The Birds -- Participants made edible decorations for birds to put in their yards. They also went on a guided walk to observe some resident and migratory birds that might eat the edible decorations.

Salt Marsh Gifts Walk -- This program began with a walk through the salt marsh investigating its "gifts" (or beneficial characteristics), and ended with opening actual presents that represented the "gifts" discovered outside. Participants also did an activity to learn how they can protect the gifts of the salt marsh by preventing urban runoff pollution.

Easter Adventure -- Participants went on a walk in search of natural Easter eggs, or evidence of them. After viewing many nesting birds, visitors returned inside to play a scavenger hunt which showed that each one of us can help protect the nesting birds by properly disposing of waste products to prevent urban runoff pollution. They also painted dough eggs in the shape of natural eggs laid around the Refuge, and received treats.

A Ghost Town in San Francisco Bay? -- This was the most popular slide show again in 1997. The volunteers presenting the shows did an excellent job of relating the

history of the ghost town. Visitors always left with the understanding that the old hunting village failed because the surrounding habitat was destroyed.

Ghost Town Tours – Drawbridge tours were conducted every Saturday during the dry season. This tour is not publicized, but earns its popularity through word-of-mouth advertising. Volunteer tour leaders impressed upon the over 450 visitors that human destruction of the natural environment was the cause for the town's demise.

"Geotalk! Geowalk!", a two-hour program involving a slide show and a hike, provided visitors an opportunity to learn all about the geology of the San Francisco Bay area, but especially the Refuge.

Life and Death Between the Tides – which begins with a short slide show introducing the participants to the habitats of the Refuge, and continues with a hike of the trails to experience these habitats first-hand.

Canoe the Slough – This program is an interpretive introduction to the natural history of the refuge from a different point of view. During the 2-3 hour guided canoe trip, there are 6-8 scheduled stops for interpretation of topics including salt marsh ecology and habitat, endangered species, migratory birds, and native Americans.

Bike the Bay -- On this guided bike tour visitors viewed the wildlife of the area by pedaling along the salt pond levees that crisscross the Refuge.

Organized public groups – Scout packs and troops, Milpitas Moms & Tots, after-school child care centers, universities and colleges, senior centers, corporations, churches, law firms and many, many more groups of different kinds participated in tours of the wetlands at the Refuge. In discussions and activities they learned about the uniqueness of the habitats, the diverse life dependent on them, basics of ecology and natural history, and other concepts such as protection of wildlife through prevention of urban runoff pollution from storm drains.

Do-It-Yourself Interpretation

Discovery Packs – Our ongoing program is designed for families and other groups who want to hike the Tidelands Trail and take an up-close look at the habitats and plants and animals along the way. Discovery Packs are kept in the Visitor Center and can be checked out by visitors (such as families, scout groups, etc.). A poster advertises the program. The person who checks out the pack leaves a driver's license or a set of car keys with the volunteer at the desk. When they return the pack, they clean the equipment, count items issued, and retrieve their collateral item. The packs have activity ideas for investigating the habitats at the Refuge.

Off-Site Interpretive Programs

1997 Urban Runoff Management Plan Workshops -- Urban runoff pollution prevention activities were displayed and presented at public workshops during the summer in San Jose, Cupertino and Milpitas. These activities were displayed to demonstrate how the interpretive program at the Environmental Education Center is part of the public information and participation activities of the Santa Clara Valley Urban Runoff Pollution Prevention Program.

Shorebird Safari -- This was the first year that the Refuge coordinated a program with the Alviso Library Summer Reading Program. In this program participants took Refuge shuttles from the library to the Alviso Marina for a guided walk in search of migratory shorebirds. The library provided safari hats and Polaroid cameras for participants to take photo souvenirs of the trip. As participants discovered how important the San Francisco Bay is for millions of migratory shorebirds, they also learned that they can help protect them by preventing urban runoff pollution.

Storm drain pollution program -- An activity was developed, created and donated to Palo Alto Baylands to show the importance of preventing storm drain pollution. It includes an activity script for educators and hand made puppets representing local bay organisms. Participants use the specialized puppets to simulate the food chain and show that storm drain pollutants can accumulate to harmful levels through the food chain. This activity shows that the prevention of storm drain pollution is vital to all life around the bay. It was used extensively in their summer camp program and is being incorporated into other environmental education and interpretive programs.

Throughout the year, staff members spoke to numerous civic, business, church, and social groups, providing nearby communities a service while disseminating information about the Refuge and its resource s.



Visitors stenciled "No Dumping, Flows To Bay" on this storm drain.

H.7. Other Interpretive Programs

In spite of all of the efforts that we made during the year to contact the public, we know that there are many thousands of people out there who don't know about us or whose interests do not include endangered species, wetland preservation, migratory birds or anything else along those lines. Reaching *these* people is one of the most challenging tasks with which the public use staff is confronted. People first need to know that the Refuge exists, then the next step in reaching them is getting them out to the Refuge where they can see with their own eyes what sort of job we are doing and what needs to be done in order to protect wildlife habitat.

In order to get the word out about us and to ultimately get people to the Refuge, the public use staff participated in some non-traditional education and outreach efforts. The following briefly describes what projects were undertaken in 1997.

Tideline -- Foremost among our non-traditional interpretation efforts was the production of a quarterly newsletter, *Tideline*. A copy of each issue of the newsletter is included at the back of this narrative. In 1997, *Tideline* was distributed quarterly to 23,500 Bay Area households, school, businesses, churches, hospitals and libraries. It was considered to be our very best means of communicating our program schedules, announcements, news stories, advertisements and editorial comments. In fact, many of our programs were filled to capacity by *Tideline* recipients. *Tideline* has been used as a text at a training course for urban managers at the National Park Service's Training Center at Harper's Ferry in West Virginia. It is also used as a supplement to formal text books in many high school biology classes. We repeatedly get requests from biology teachers for subscriptions for that purpose.

Tideline, which is financed by San Francisco Bay Wildlife Society, was printed on recycled paper. Our mailing list was managed by Volunteer Howard Collins and Kris Young, who coordinated additions, deletions and changes to the list. Volunteers also helped with applying address labels to the issues before mailing. Without volunteer assistance, *Tideline* would not be possible.

Avocet Gazette -- *Avocet Gazette*, a quarterly newsletter for volunteers and staff members, focuses on news, events, and upcoming projects at the Refuge. This is an excellent way for staff members to recruit volunteers for projects, and to report on events.

Native Plant Nursery -- The San Francisco Bay Wildlife Society continued to manage a Native Plant Nursery that grows plants to enhance native habitat on this and other Refuges. It was also established to serve as a vehicle for reaching out and contacting non-Refuge visitors and thus bring them to the Refuge. Over 200 species of native herbs, shrubs and trees were grown in the nursery, entirely through the efforts of volunteers. The Native Plant Nursery is managed by Harry Sanders, a volunteer who is accredited as "Master Gardener" through the University of California Agricultural Extension program.

Artist's Receptions -- During 1997, the Refuge held four receptions for local artists who exhibited their original artwork in the Visitor Center auditorium. These exhibits

portray habitats and wildlife found on the Refuge and around the San Francisco Bay area. Visitors have the opportunity to meet and talk with artists who devote their time and talent to capturing the beauty of Refuge wildlife. Through this artwork, visitors can experience the beauty and wonder found in the habitats of the bay, and come to better understand the need for conservation.

The receptions were advertised in *Tideline*, and were well attended. Many people who came to the receptions were first time visitors to the Refuge. The San Francisco Bay Wildlife Society provided refreshments.

H.8. Hunting

Hunting occurred on the Refuge in many intertidal areas and some salt ponds. Parts of Newark Slough and Mallard Slough in close proximity to hiking trails and high visitor use areas were never opened to hunting. During the course of the year, about 4,000 waterfowl hunters visited the Refuge. Shoveler, scaup and teal made up the majority of the bag.

H.9. Fishing

Anglers made good use of the several saltwater fishing areas on the Refuge.

Dumbarton Fishing Pier and the adjacent north and south trails along the Bay are favorite fishing spots for anglers. The access road to this area is closed to motor vehicles from April through August each year to protect the threatened Western Snowy Plover which nest adjacent to the road. Plover chicks have been known to enter the roadway, which put them at risk of being struck by the often heavy traffic moving to and from the pier. The road is still open to pedestrian and bicycle traffic, and a shuttle is available by reservation to take anglers to the fishing pier on weekends.

Coyote Creek Lagoon, at the southeast portion of the Refuge, is a favorite bank fishing spot for those hoping to hook a white sturgeon. Bank fishing also occurs on a smaller scale in the Ravenswood area located at the west approach to the Dumbarton bridge. All together, we estimate served over 6,000 saltwater angler "uses" on the Refuge this year.

Fishing from or near the pier has netted a variety of fish: leopard shark, sand shark, bat ray, shiner surf perch, kingfish, bullhead, and the elusive striped bass, sturgeon and salmon.

Sport fish in San Francisco Bay contain chemicals at levels that may harm those who eat the fish. The Refuge posted information supplied by the California Office of Environmental Health Hazard Assessment that advised anglers to limit the amount of Bay fish that is eaten. These warning signs were posted in Korean, Spanish, Cambodian, Chinese, Vietnamese, and English at the most popular fishing areas.

H.10. Trapping - Nothing to report.

H.11. Wildlife Observation

The opportunity to view wildlife in its natural habitat attracts many of our visitors. The Refuge offers a variety of habitats such as salt marsh, sloughs, extensive mud flats, open water and upland coastal chaparral, grassland and trees. This range of habitats provides an ideal area for visitors to explore, on their own or with our naturalists, when seeking local wildlife.

Some visitors participated in van tours or canoe trips on Mallard Slough and Triangle Marsh, where marsh-nesting and feeding birds were easily seen. Most visitors walked or biked the many miles of Refuge trails on their own, viewing resident nesting birds, migrating and wintering shorebirds and waterfowl, and young birds during the spring and summer months. Bird watchers revel in these opportunities. In addition, many nature study groups led field trips to our Refuge, and the Audubon Society once again conducted its annual Christmas bird count here.

One of the most popular sites for local bird watchers was the restored tidal area, LaRiviere Marsh, where great numbers of shorebirds and migrating waterfowl gather to feed. There is also a peregrine falcon commonly sighted here.

In June, the Refuge participated in the 9th Annual Butterfly Count sponsored by the North American Butterfly Association. The event drew a number of seasoned, professional lepidopterists as well as first-time amateurs. The counters spent the day searching out butterflies near the Visitor Center and EEC, as well as a nearby riparian corridor. They noted 17 species among a total of 612 butterflies sighted. It was great fun for everyone and will be repeated in 1998!

H.12. Other Wildlife Oriented Recreation - Nothing to report.

H.13. Camping - Nothing to report.

H.14. Picnicking - Nothing to report.

H.15. Off-Road Vehicles - Nothing to report.

H.16. Other Non-Wildlife Oriented Recreation - Nothing to report.

H.17. Law Enforcement

The goals of our public safety unit continue to remain the same; to swiftly react to crime and public safety concerns as a short-range goal and to continually evaluate our efforts to prevent crime from occurring and to correct public safety hazards as a long-range goal. The 1997 Law Enforcement staff was comprised of two full-time police officers and two collateral duty officers. As the Refuge's visitation and properties increase, our officers will be greatly challenged.

The Refuge's police officers patrol Don Edwards S.F. Bay NWR and the other Refuges within the Complex. In 1997, due to staffing limitations, patrols of San Pablo Bay NWR were severely curtailed due to other law enforcement priorities at different parts of the Complex. Antioch Dunes NWR has been continually plagued by vandalism done by trespassers. Holes were cut in the perimeter fence, human waste and household garbage were dumped on the Refuge, and a cave was carved into the riverbank. These problems were fixed as they occurred; the cave was filled in by the end of 1997.

Problems at other Refuges in the Complex were also reported. An auto burglary was documented at Salinas River NWR. A suspect was arrested for driving and being under the influence of a controlled substance and alcoholic beverages.

Most of the police work took place at Don Edwards San Francisco Bay NWR. On March 18, Officer Barry Tarbet contacted four juveniles with alcoholic beverages and marijuana in a parking lot near the entrance gate of the Refuge. Officer Tarbet evaluated the situation and determined that no one in the car was fit to drive. A parent was called and responded to the scene. After warning the juveniles as to their actions, they were released to the custody of the parent. Upon exiting the parking lot while having a heated discussion with the juveniles, the driver pulled out into the path of an approaching car. The parent's car was broadsided as it left the lot. The car was totaled, and the parent was transported to the hospital by ambulance. One of the juveniles received minor bruises and scratches.

During 1997 three bodies were recovered in the Refuge, along the shore of the Bay. The first was a man who lived on a boat in Alviso, who became inebriated while on a friend's boat watching the 1997 Superbowl game. After the game, he left to return home to his boat. He was not wearing a personal flotation device, and was not seen again until he washed up near the Dumbarton Fishing Pier on the Refuge.

The second body was a suicide victim, found near the Pier by volunteer David Fayard. The third body – or half-body – was a power saw homicide victim, discovered by two juvenile trespassers who reported the victim to local municipal police officers.

Crimes investigated by Refuge police officers fall into 18 categories, with traffic incidents being the most common. Other common offenses are natural resource violations, drug offenses and vandalism. The following table lists and compares incidents over the last three years.

Incidents Investigated by Refuge Police Officers			
Category	1995	1996	1997
Burglary-forced entry	5	10	4
Burglary-no force	0	1	1
Theft	8	7	1
Vandalism	50	17	10
Weapons	30	15	3
Disorderly conduct	0	3	3
Drug offenses	20	63	29
Boating incidents	1	0	0
Aircraft incidents	0	0	6
Hate/bias crime	1	0	1
Natural resources	85	113	19
Search and rescue	1	4	1
Other Service incidents	60	61	77
Suspicious circumstance	2	3	3
Recovered-bodies	0	0	3
Recovered-vehicle	0	1	1
Gang graffiti	5	2	3
Traffic incidents	149	195	73

H.18. Cooperating Associations

For ten years, San Francisco Bay Wildlife Society (the Society), a nonprofit cooperating association, has sponsored and underwritten education and interpretation programs for the Refuge. Originally established to support just this one refuge, SFBWS assisted nine national wildlife refuges during 1997. Five of these had visitor center bookstores managed by the Society: Don Edwards S.F. Bay, Tulelake, Malheur, Sacramento and Salton Sea. Turnbull NWR's environmental education program and Hopper Mountain NWR's Condor Recovery Fund were also supported by the Society. Ruby Lake NWR and Mid-Columbia River NWR had joined the Society by the end of the year, with plans for bookstores, proposal writing and membership programs. All nine refuges, to varying degrees, accepted cash or in-kind donations and memberships from individuals or businesses in their communities. Several refuges, in addition, received corporate, foundation or government grants to support their programs.

A two-day "All Refuges Retreat" was held in February, 1997 at the Golden Gate National Recreation Area. This gathering was facilitated to allow for intense participation by two members from each refuge, one representative from the Regional Office, and the Society Board of Directors and staff. The Division of Refuges underwrote travel and lodging expense. Discussion flowed with goals being made for better financial reporting and increased mentorship.

San Francisco Bay Wildlife Society cultivated income from a variety of sources to support its own overhead and Don Edwards S.F. Bay NWR operations, from bookstore, native plant and publication sales; memberships; donations; corporate, foundation and government grants; and special events. The environmental education, interpretation, law enforcement and volunteer programs of the Refuge all benefited from Society financial assistance. The major uses of funds continue to be *Tideline* newsletter, the volunteer program, publications and capital equipment. In addition, the education, interpretive and volunteer programs receive annual operating budgets.

Bookstore income at both the Visitor Center and the Environmental Education Center rose this year due to our publication of a new edition of *Exploring Our Baylands*, a book that interprets salt marsh ecology. Mail order sales alone generated \$3,000 and wholesale sales reached \$4,000.

Gross revenues at the two bookstores, \$36,900, exceeded 1995 bookstore income. EEC bookstore sales increased dramatically (\$4,446) from increased visitation at weekend interpretive programs.

The Native Plant Nursery held large Fall and Spring plant sales in conjunction with other Refuge events. The \$7,184 raised from these sales was used for purchase of plants, supplies and equipment for various habitat restoration programs. In addition, surplus native plants were sold at the Visitor Center bookstore.

The Society also managed contributions to the Environmental Education Center Butterfly Garden and Migratory Songbird Garden. Local corporations supported these projects by bringing in volunteer work parties, and cash donations supported the purchase of needed project materials.

Individual gifts totaled \$4,389 from Visitor Center and EEC donation boxes, from matching gifts, unsolicited gifts and honoraria. This income source has grown tremendously as the community becomes aware that tax-deductible donations can be made to support the Refuge.

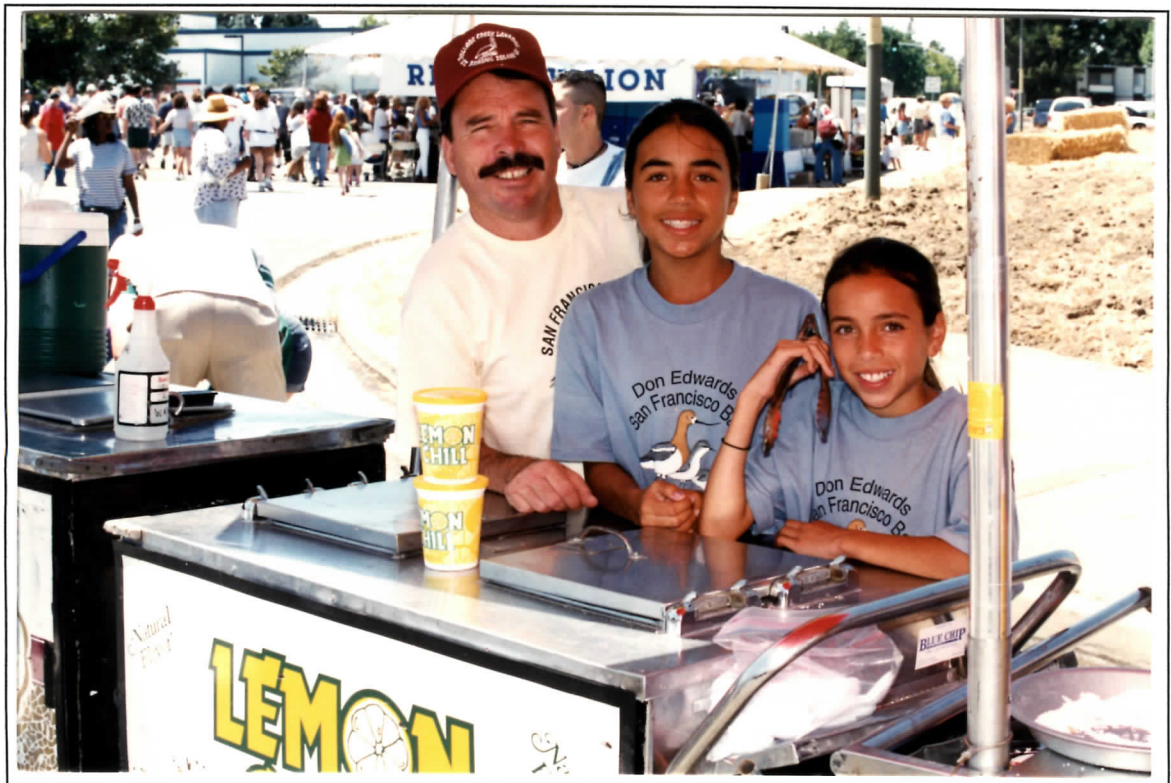
Successful proposal writing by Society and Refuge staff yielded greater financial support of Refuge programs. Corporate and foundation grants were awarded for wish list items of equipment and supplies as well as for enhancement of education programs. Grant funding paid for various educational programs, and for the purchase of supplies and equipment. Grant writing has also sustained efforts at Turnbull NWR.

The membership program has become a significant part of Society income. Gross revenues from new and renewing members totaled \$26,700. Mail campaigns using premiums were sent to *Tideline* subscribers and a mailing list from another nonprofit



Volunteers from Community Impact (above) spread mulch, pulled weeds and performed other assorted tasks in the Butterfly Garden.

John Steiner, and volunteers Monica Steiner and Jennifer Steiner (below) sold refreshments at the Fremont Festival of the Arts.



organization. Appeals will continue to be sent to friends of the Refuge, as this activity has been so successful. More donors continue to join or renew their memberships at higher dues categories. Refuge Partners, a major donors program that focuses on gifts between \$1,000 and \$50,000, is being developed to allow the Society to support the Refuge's programs at a much greater level.

Special events supported by the Refuge staff and volunteers increased community awareness. Through membership in the Fremont Chamber of Commerce, the Society-run food carts at the Fremont Festival of the Arts grossed \$3,253 over one weekend.

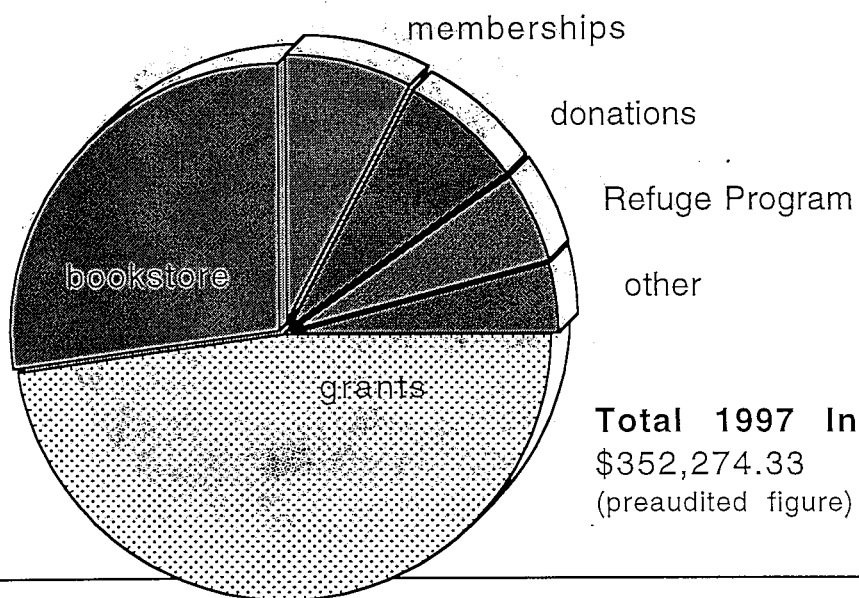
A capital campaign for the Refuge's 25th Anniversary was launched with a one-year goal of \$250,000 for a new boardwalk, an interpretive kiosk and various south bay habitat restoration projects. Direct mail, proposal writing and individual solicitation will be the planned sources of income.

A nine-member, all volunteer Board of Directors sets policy for the organization. Cecily Harris, part-time Development Director, manages the finance, fundraising and refuge relations activities for the Society. Other Refuge volunteers assist with the bookstore, membership and bookkeeping activities.

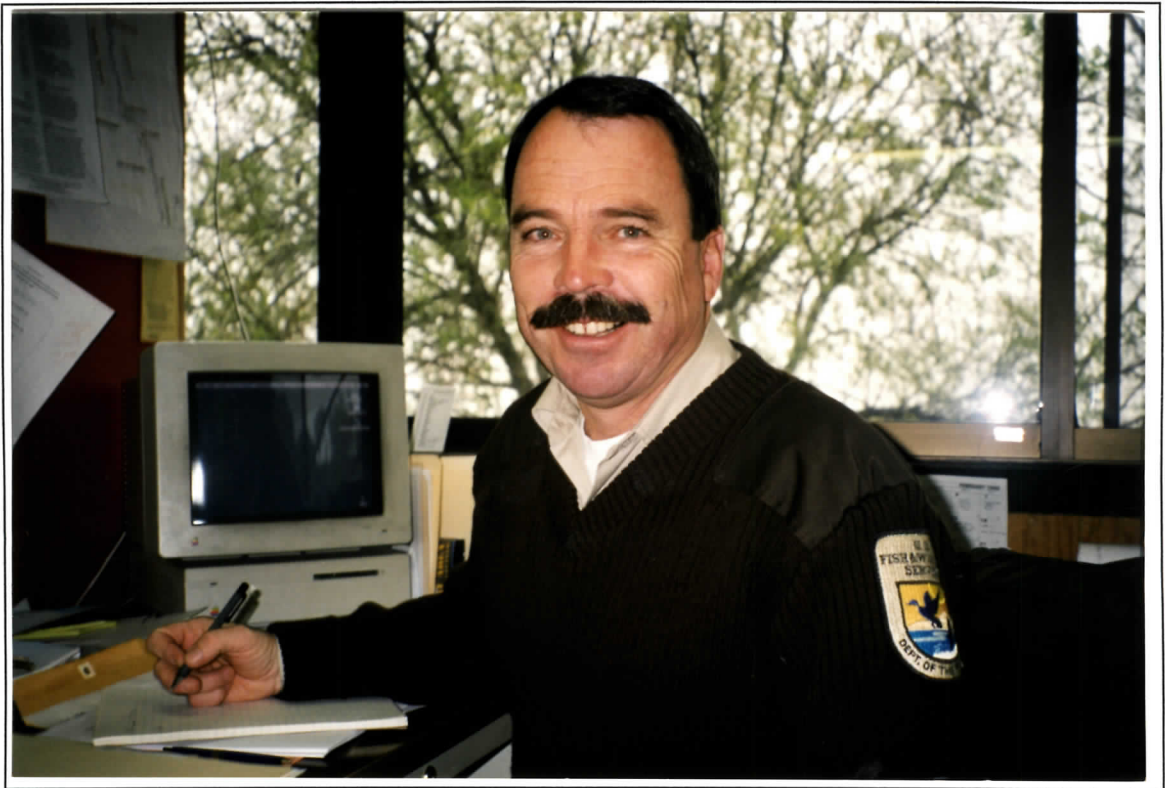


Development Director Cecily Harris began the San Francisco Bay Wildlife Society fundraising campaign at the Refuge's 25th Anniversary Celebration.

San Francisco Bay Wildlife Society 1997 Income



Total 1997 Income:
\$352,274.33
(preaudited figure)



John Steiner, Public Use Supervisor

Fran McTamaney, Environmental Education Coordinator





Sandy Spakoff, Environmental Education Center Director

Amy Hutzell, Environmental Education Specialist





Nancy Fries, Volunteer Coordinator (COB 3/97), with Volunteer Peter French

Eunice Kang, Volunteer Coordinator (EOD 9/97), with Volunteer Ken Crowley

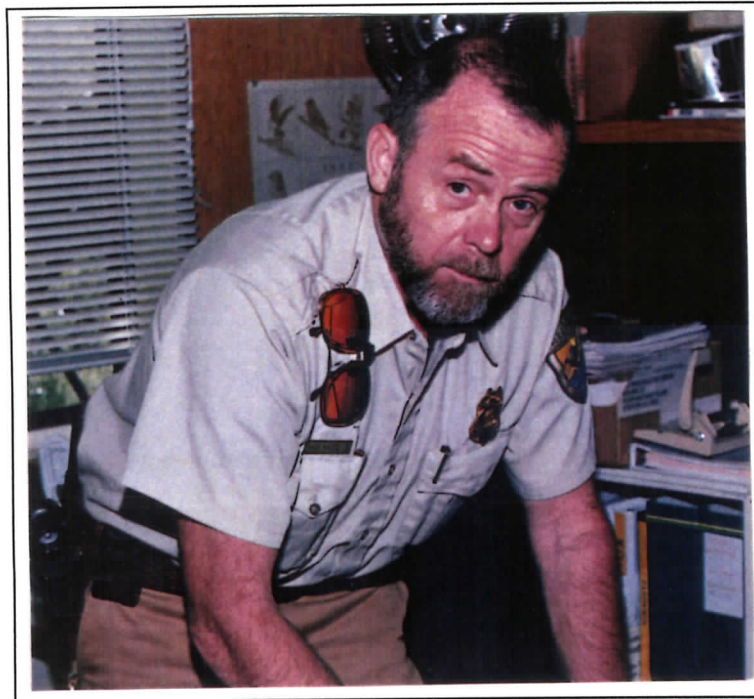




Barry Tarbet, Police Officer

John Adamson, Police Officer





Rich Haire, Outdoor Recreation Planner (COB 9/97)

Cecily Harris, S.F. Bay Wildlife Society
Development Director



Christine Coy, S.F. Bay Wildlife Society
Interpretive Specialist

